Example

Let a portion of the network be as in FIG. 1.

Let device 'x' break. The NMC now will now receive no replies from 'x', 'B' or 'C'. It will also find that the traffic between 'D' and 'x' has dropped to zero.

The methods described above can be performed as a single method of partitioned into two or three methods. They can record and/or report the change or current state of the devices and interfaces under consideration to a database or file, to another software element or elements within the same cpu or not, directly or remotely to a screen or screens, to one or more NMCs, or in other ways. They can operate in a single cpu or distributed in multiple cpus. Each method can consider one or more devices, either serially or in parallel. The methods can share a common input of responses from the NMC or can have different input forms, and the methods can be integrated within a single NMC, istributed among several NMC or performed partially or wholly by other cpus.

I claim:

1. A method of analyzing a communication network comprising:

determining a mean drop rate in a device x by polling each device from a network management computer (NMC) which is in communication with the network, and processing signals in the NMC to determine a drop rate D(x), in accordance with:

$$D(x)=((L+(x)-L-(x))/2,$$

$$\text{and } L(x)=1-A(x)$$

where

A(x): the fraction of poll requests from the NMC to device x for which the NMC receives replies (measured over the last M sampling periods), (wherein x must not be broken),

D(x): the mean frame drop rate in device x,

L(c): NMC's perception of the loss rate to device x and back,

L-(x): the NMC's perception of the mean value of L(z) for all devices z connected to device x, closer to the NMC than device x and which are not broken, and

L+(x): the NMC's perception of the mean value of L(z) for all devices z connected to device x, further away from the NMC than device x and which are not broken.

2. A method of analyzing a communication network comprising determining a mean frame transit delay in a device x by polling each device from a network management computer (NMC) which is in communication with the network and processing signals in the NMC to determine a transit delay T(x) in accordance with the process:

$$T(x)=((W+(x)-W-(x))/2$$

where

T(x): the mean frame transit delay for device x, (wherein device x must not be broken),

W(x): the mean round trip time taken between a poll request from the NMC to device x and the receipt of the reply by the NMC (measured over the last N sampling periods),

W-(x): The NMC's perception of the mean value of W(z) for all devices z connected to device x, closer to the NMC than device x and which are not broken,

W+(x): The NMC's perception of the mean value of W(z) for all devices z connected to device x, further away from the NMC than device x and which are not broken.

3. A method of analyzing a communication network comprising determining a break state of communications devices connected in the network, by polling each device from a network management computer (NMC) which is in communication with the network, and processing signals in the NMC in accordance with at least one of

(a) (i) receiving no replies to polling signals directed to a device,

(ii) receiving no replies from devices lying beyond said device,

(iii) detecting no traffic flowing in any lines to or from said device,

(iv) detecting changes to line status bits on lines connected to said device;

(b) (i) determining zero traffic on a line and a device being otherwise determined as not being broken, declaring the line as being broken,

(ii) declaring a line as being broken in step (b)(i) after a predetermined period of time,

and

(c) processing steps (a) and (b) with lines having more than two ends, as if it were a single device from the point of view of breaks.

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